9.1 part 2 notes

MARGIN OF ERROR: (0.40, 0.70)

* We want our margin of error to be ....

as small as possible (0.53, 0.57)

* What things can we do to decrease the margin of error?

* increase sample size (n)

* decrease confidence level (Z*)

Choosing sample size:

* We can choose sample size ... to get a specific margin of error

* How? What part is the margin of error?

$M = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ $\hat{p} = \frac{\#}{n}$

* Plug in ... m, Z*, $\hat{p}$, (1 -- $\hat{p}$) and solve for n

** PROBLEM: don't know $\hat{p}$ if we haven't taken the sample yet

** ANSWER: use $\hat{p}$ from a previous sample

* But what if we aren't given a value/guess for $\hat{p}$?

use 0.50 (50%)

Example: An EPA investigator wants to know the proportion of fish that are inedible because of chemical pollution downstream of an offending factory. If the answer must be within 0.03 at the 95% confidence level, how many fish should be in the sample tested?

$m = 0.03$

$c = 95\%$

$\hat{p} = 0.50$

$m = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

$\frac{0.03}{1.96} = \frac{1.96\sqrt{\frac{0.25}{n}}}{1.96}$

n = 1068 fish

$n \cdot \frac{2.34272...}{2.34...} = \frac{0.25}{2.34...}$ 0.25/Ans

ALWAYS round up! **because...**

Examples on the back of the paper...

Section 9.1 – Choosing Sample Size

1) If an experimenter wishes to estimate the probability that a person will react in favor of stimulus *A*, how many people must be included in the experiment? He wants the margin of error to be 0.04 with 90% confidence. Assume that he expects *p* to be close to 0.6.

$0.04 = 1.645\sqrt{\frac{(0.6)(0.4)}{n}}$

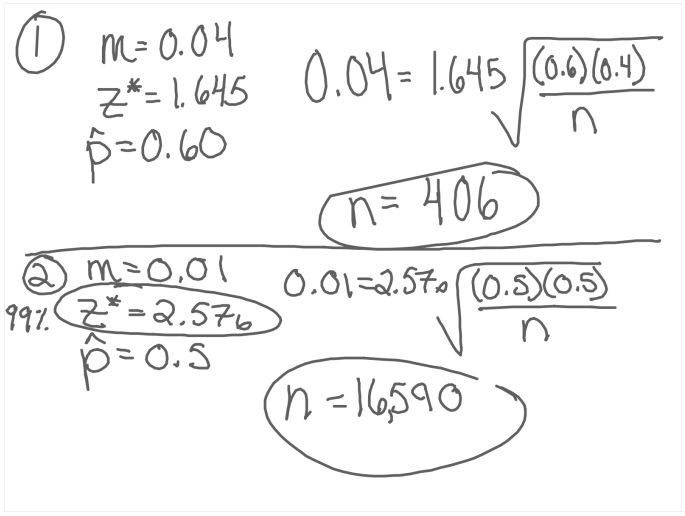
$\frac{n}{\#} = \frac{(0.6)(0.4)}{\#}$

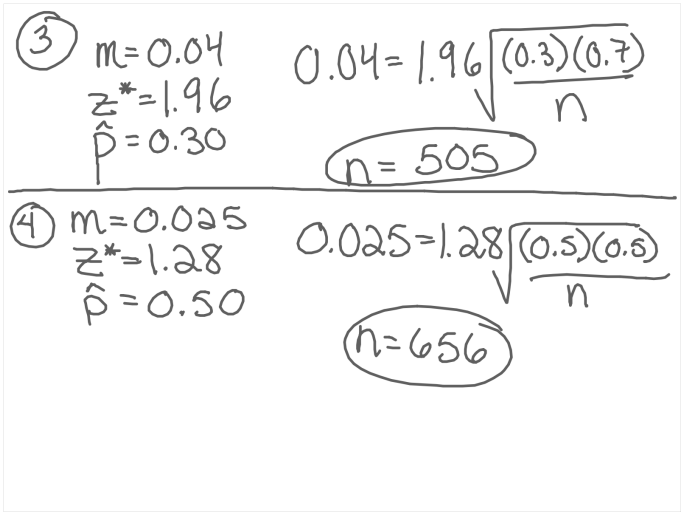
n = 406 people

9.1 notes- part 2

Complete examples 2, 3, and 4 on the back of the notes

from yesterday





Bonus problems:

Where do the Z* numbers come from??

90% confidence:

95% confidence:

Find the Z* for 92% confidence:

85% confidence:

Another bonus problem:
I have a confidence interval that is (0.30, 0.40)

(a) What is my sample proportion?

(b) What is my margin of error?

(c) If my sample size is 200, what is my level of confidence?

Another bonus problem:
I have a confidence interval that is (0.42, 0.51)

(a) What is my sample proportion?

(b) What is my margin of error?

(c) If my sample size is 320, what is my level of confidence?

Extra credit problems for the CW:
(do on separate paper and staple to your CW)

1) What is the Z* for 91% confidence? (show work)

2) Given the following interval: (0.137, 0.263)
   Find the level of confidence if the sample size is 150.
   (first find p-hat and margin of error to help you)